A.D. 1868, 11th February. N° 460.

SPECIFICATION

OF

JOSEPH ROBERTS STONEY.

CONSUMPTION OF SMOKE, &c.

LONDON:
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1868.

A.D. 1868, 11th *February.* N° 460.

Consumption of Smoke, &c.

LETTERS PATENT to Joseph Roberts Stoney, of Leeds, in the County of York, Engineer, for the Invention of "Improved Appliances for the Consumption of Smoke and the Economizing of Fuel in Steam Boiler and other Furnaces."

Sealed the 7th August 1868, and dated the 11th February 1868.

PROVISIONAL SPECIFICATION left by the said Joseph Roberts Stoney at the Office of the Commissioners of Patents, with his Petition, on the 11th February 1868.

I, Joseph Roberts Stoney, of Leeds, in the County of York, Engineer, do hereby declare the nature of the said Invention for "Improved Appliances for the Consumption of Smoke, and the Economizing of Fuel in Steam Boiler and other Furnaces," to be as follows:—

The objects of my Invention are the more perfect combustion of smoke and the greater economizing of fuel in furnaces, more especially in steam boiler furnaces. Taking, for example, an ordinary internal flued boiler, I use a double bridge, a moderate space, say of eighteen or twenty-four inches intervening, and I admit air to such space by means of ordinary trap doors in the front bridge. Over the two bridges I mount a "saddle" of baked clay or fire-brick (made for convenience in halves) causing the upper portion to fit the flue at the ends, but being hollowed out in the centre and communicating at the sides with the air space between the two bridges. Throughout the length also of the "saddle" runs an internal flue in the form of a quadrant at the ends, but having internally a serpentine or saddle formation. From this flue downwards to the bottom of the "saddle" are air communications with the space between the bridges, and also from it are air communications upwards with the centre hollow before referred to. The operation of this arrangement is that the flame passing from the fire through the saddle flue mingles with air received from the downward communications with the space between the bridges as well as with air from the same space which passes between the external centre of the saddle and the flue, and descends the upward communication. The smoke is thus better consumed and fuel economized.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Joseph Roberts Stoney in the Great Seal Patent Office on the 11th August 1868.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, Joseph Roberts Stoney, of Leeds, in the County of York, Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Eleventh day of February, in the year of our Lord One thousand eight hundred and sixty-eight, in the thirty-first year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Joseph Roberts Stoney, Her special licence that I, the said Joseph Roberts Stoney, my executors, administrators, and assigns, or such others as I, the said Joseph Roberts Stoney, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "Improved Appliances for the Consumption of Smoke, and the Economizing of Fuel in Steam Boiler and other Furnaces," upon the condition (amongst others) that I, the said Joseph Roberts Stoney, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Joseph Roberts Stoney, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:—

The objects of my Invention are the more perfect combustion of smoke and the greater economizing of fuel in furnaces, more especially in steam boiler furnaces. Taking, for example, an ordinary internal flued boiler, I use a double bridge, a moderate space, say, of eighteen or twenty-four inches more or less intervening, and I admit air to such space by means of an ordinary trapdoor or doors in the front bridge. Over the two bridges I mount a saddle of "baked" clay or fire-brick (made for convenience in halves) causing the upper portion to fit the flue at the ends (allowance being made for expansion), but being hollowed out in the centre and communicating at the sides with the air space between the two bridges. Throughout the length also of the "saddle" runs an internal flue in the form of a quadrant at the ends, but having internally a serpentine or saddle formation. From this flue downwards to the bottom of the "saddle" are air communications with the space between the bridges, and also from it are air communications upwards with the centre hollow before referred to. The operation of this arrangement is that the flame passing from the fire through the "saddle" flue mingles with air received from the downward communications with the space between the bridges as well as with air from the same space which passes between the external centre of the saddle and the flue and descends the upward communication. An alternative arrangement consists in placing the "saddle" upon a double bridge placed at a suitable distance behind the ordinary bridge, and thus creating another vertical air passage in addition to those previously obtained. A trapdoor in the front bridge for the admission of air is also used. I generally prefer however to admit the air by means of a swing box door (operated upon by an arrangement afterwards explained) by means of which the air supply is graduated.

In order however that my Invention may be the better understood reference is made to the accompanying Sheet of Drawings, and to the figures and letters marked thereon, that is to say:—

DESCRIPTION OF THE DRAWINGS.

Figure 1 is a vertical section of my first-named arrangement, and Figure 2 of the alternative plan, Figure 3 being an enlarged plan view of the swing air door arrangement.

Letter A (Figure 1) shews the saddle in section with air passages *a, a, a*; letter *b* indicates the serpentine passage through it; letter a^1 shews the hollow referred to in the centre of but outside the saddle, and which passing round the same communicates with the air space B between the two bridges C, C, upon which the saddle A rests; letter *c* denotes the space allowed for the expansion of the saddle; letter *d* is one of the bearings of the swing door (more particularly referred to in the description of Figure 2), and *e* is a door placed at the back of the second bridge to facilitate flue cleaning. The arrows indicate the direction of the air draught, the smoke from the furnace mingling on its passage through the saddle with the upcast and downcast shafts or air passages *a, a, a,* fed from the intermediate chamber B, it in turn receiving its air supply through the door which swings on the bearings *d*. Figure 2 shews my alternative plan in which it will be seen that the double bridge A, A, is placed behind the ordinary bridge B with an air space C intervening. The shape of the saddle D is somewhat different to that of the one previously shown, having no external centre air passage, and being made wider in the mouth so as more effectually to catch the flame and smoke. Letter E denotes the swing box door referred to fitted at one end with two angular feathers *e, e,* at opposite points. This box is divided horizontally at the centre into two compartments communicating with each other, and it is partially filled with sand; F is a slotted rod, one end of which is borne by a bracket *f* in the bridge support, whilst a stud from the fire-hole door catches the other end (not shewn). Within the slot a notched lever *g* (see Figure 3) is free to play upon a stud g^1. Upon the rod F being drawn out a certain distance by the opening of the fire-door and the consequent action of the stud affixed thereto upon the outer end of the rod F, the lever *g* is simultaneously drawn back and thrown slightly inwards by the angularity of the inside of the bearing bracket *h*. This motion throws the notch part of the lever *g* opposite the feather *e*, and when the fire-door is closed it presses against it and throws the box into the position shewn in dotted line (Figure 2). The swing door E is now wide open and the sand begins to percolate from that which was the lower compartment to that which now is, and so gradually to close and cut off the air supply. In this as in the previous case the arrows indicate the direction of the air currents, showing where they mingle with the flame and smoke. In other respects the arrangements are similar.

Having now fully described the nature of my Invention, and in what manner the same may be performed, I wish it to be understood that what I claim is,—

Firstly. The use of baked clay or fire-brick saddles for the more effectual combustion of smoke, constructed substantially as shown and described, without confining myself to the precise details shewn.

Secondly. The arrangement of such saddles in furnaces on a double bridge, or placed behind the ordinary bridge, as shown and described.

Thirdly. The swing sand box door arrangement for the admission of air, substantially as shewn and described.

And, lastly. The whole combined arrangement, as shewn and described, for the purposes named in my title.

In witness whereof, I, the said Joseph Roberts Stoney, have hereunto set my hand and seal, this Tenth day of August, in the year of our Lord One thousand eight hundred and sixty-eight.

JOSEPH ROBERTS STONEY. (L.S.)

Witness,
PHILIP H. SHARP,
Patent Agent,
Leeds.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1868.

A.D. 1868, Feb. 11, Nº 460,
STONEY'S SPECIFICATION.

(1 SHEET)

FIG. 3.

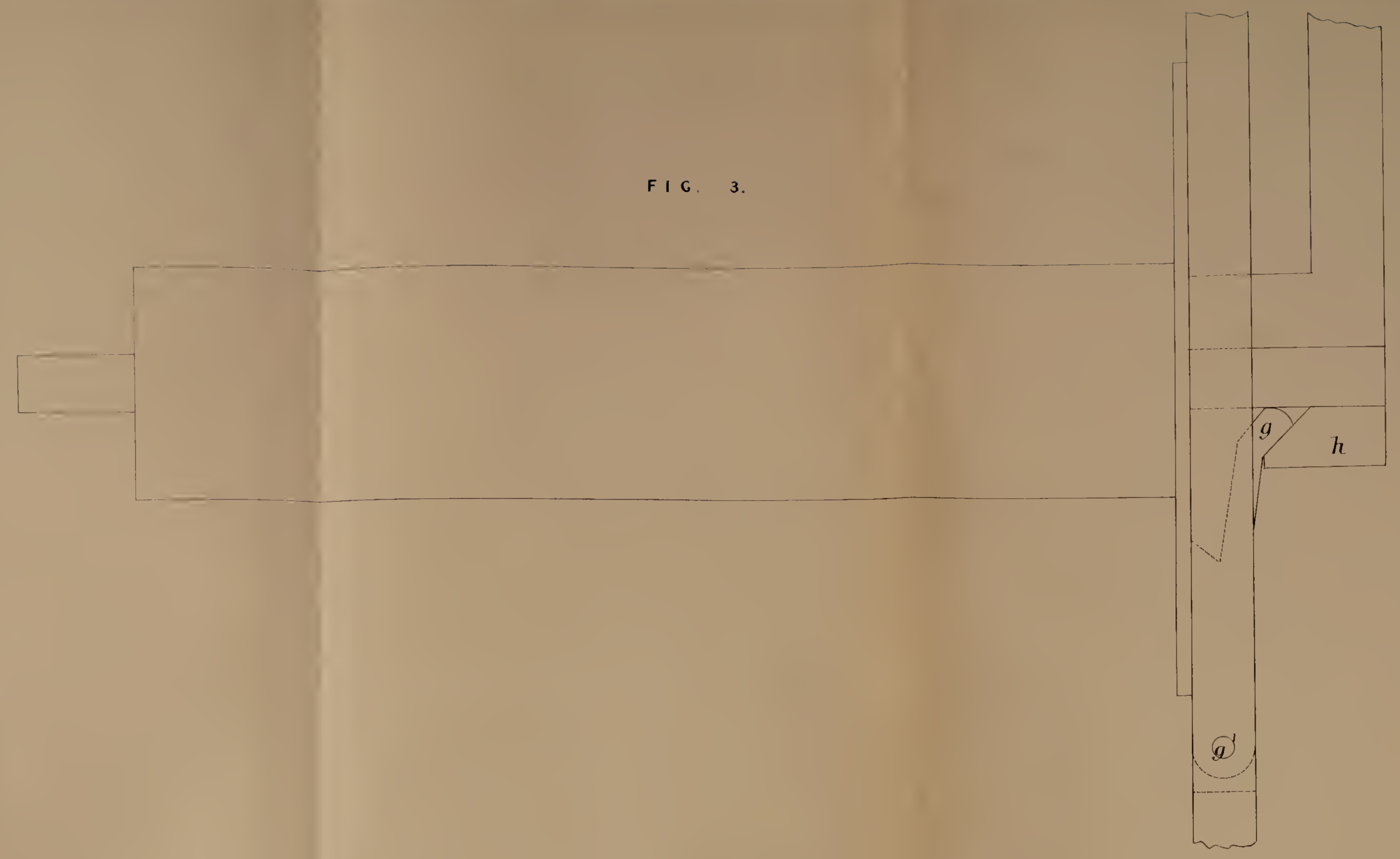


FIG. 1.

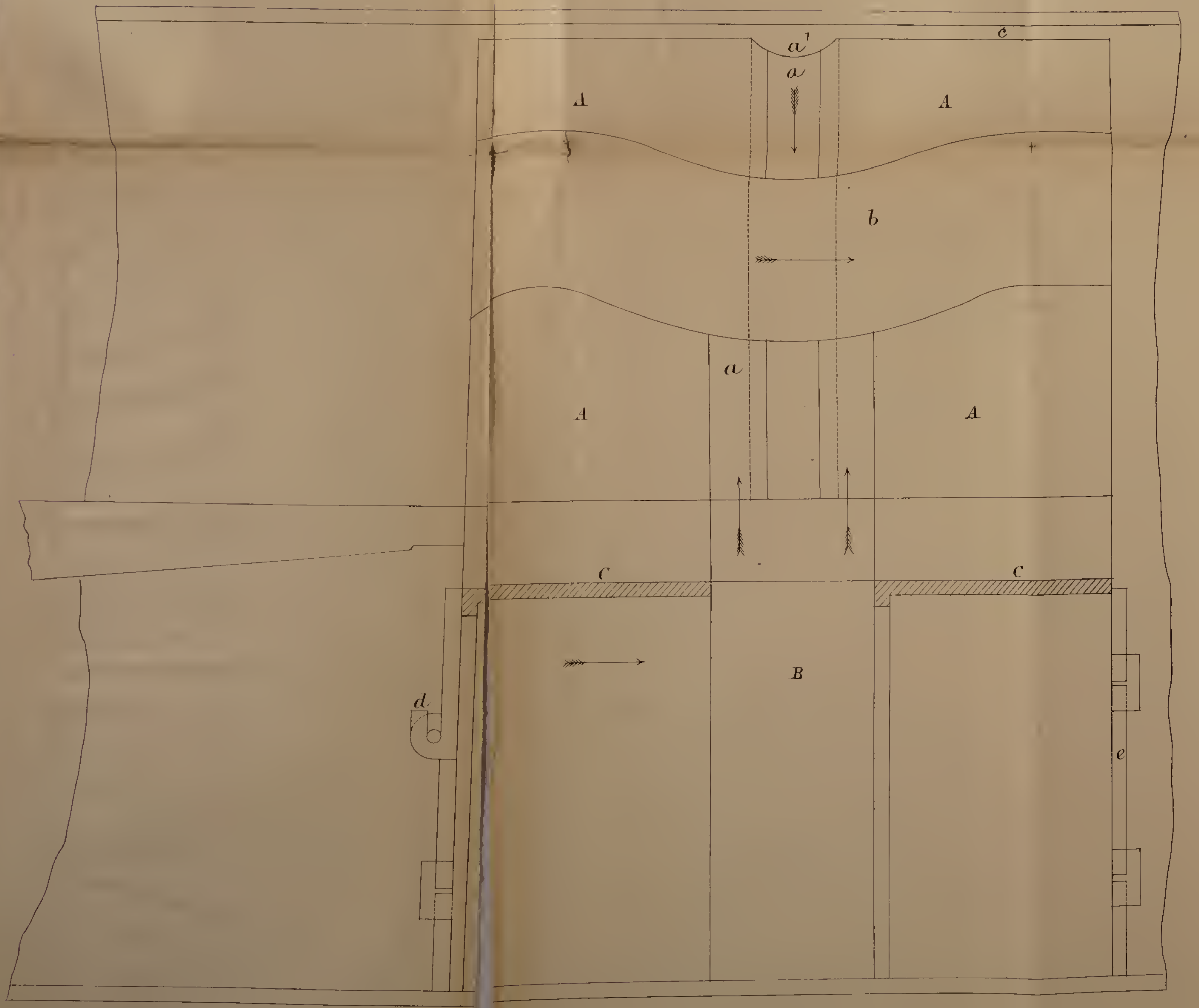
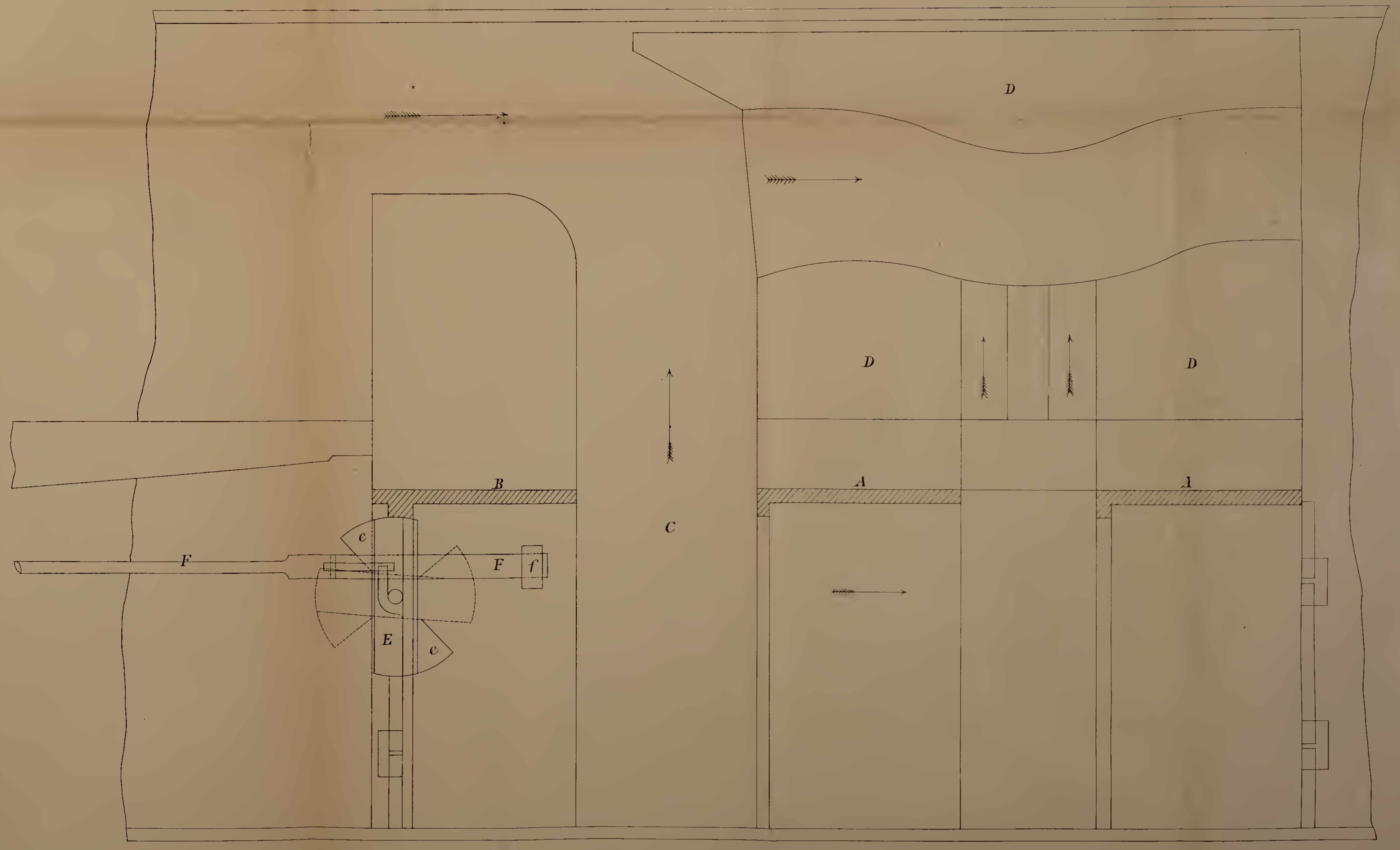


FIG. 2.



The filed drawing is not colored

Drawn on Stone by Malby & Sons.

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